INTERNATIONAL STANDARD

ISO 15642

First edition
2003-05-15

Road construction and maintenance equipment — Asphalt mixing plants — Terminology and commercial specifications

Équipement pour la construction et l'entretien des routes — Installations de traitement de l'asphalte — Terminologie et spécifications commerciales

Reference number
ISO 15642:2003(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15642 was prepared by Technical Committee ISO/TC 195, *Building construction machinery and equipment*.

Introduction

This International Standard deals with asphalt mixing plants used in road construction and maintenance processes.

It provides definitions of equipment, processed materials, parameters and activities involved in asphalt manufacturing and technical characteristics of machinery as well. The performance of asphalt mixing plants and their components is shown.

Road construction and maintenance equipment — Asphalt mixing plants — Terminology and commercial specifications

1 Scope

This International Standard establishes the terminology, gives requirements for specifications, and lists characteristics useful for determining theoretical performances and drafting technical documents for asphalt mixing plants used in the construction and maintenance of

— motorway, road and airport pavements, and

— road system and networks.

It does not specify safety conditions, which are covered by specific standards. Equipment relating to quality control of manufactured products is defined by the standards specific to these products.

This International Standard is applicable to fixed plants during production time, whether they are transferable or not, which excludes mobile equipment for soil stabilization or retreading.

This International Standard is applicable to mixing and/or coating plants for materials treated with hydrocarbon binders

— for continuous production (see Figure A.1), and

— for batch production (see Figure A.2).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 536, *Road construction machines — Asphalt mixing plants — Safety requirements*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
asphalt mix
⟨mixed material⟩ homogeneous paving product consisting of sized mineral aggregates, possibly including additives and filler, collectively and uniformly coated with binder

3.2
asphalt mixing plant
set of equipment for asphalt mix production

3.3
batch
unit volume of material consisting of aggregates, binder, fines, possibly additives, contained and processed simultaneously in a batch-type mixer

3.4
batch plant
asphalt mixing plant in which the operations to prepare the material and mixing are undertaken by successive batches in a mixer which interrupts the material flow

See Figure A.5.

3.5
continuous plant
asphalt mixing plant in which the operations to prepare the material and the mixing are undertaken by continuous equipment and handling systems and in a mixer which does not interrupt the material flow

See Figure A.3.

3.6
output of a plant
quantity of material produced based on 1 h of stabilized operation, expressed in metric tons

NOTE The conventional output is expressed by referring to parameters recommended in Clause 5.

3.7
batch cycle
minimum duration, expressed in seconds, between corresponding operations of successive batches

3.8
reclaimed fines
small particles of aggregate, transported by the gases in the drums where the aggregates are dried and which are captured by the dust collectors

See Figure A.14.

3.9
imported filler
small particles of material other than sand or reclaimed fines and used as an ingredient of asphalt mix

3.10
residual water
water contained in the aggregate after drying

NOTE The residual water content is expressed as a percentage of the dry aggregate mass.

3.11
container
any type of bin, hopper box or tank capable of holding of constituent materials

3.12
continuous-volume dosing unit
device for proportioning the constituents in which the flow is determined by the opening height of a gate and/or the belt speed

NOTE A special device may be used to permanently check the presence of ingredients on the belt.

3.13
continuous-mass dosing unit
device for proportioning the constituents in which the mass flow is obtained by the belt speed multiplied by the mass of constituent materials spread over 1 m of the belt or measuring system of the screw feeder

See Figure A.7 c).

3.14
batch-mass dosing unit
device for proportioning in cycles the constituent materials in which the quantity delivered is determined by a weighing apparatus

See Figure A.7 a) and b).

3.15
last runnings
that quantity of ingredients delivered by the feeder but not yet measured by the weighing instrument

3.16
screening device
equipment used to classify and separate material particles by sizes passing through the grate openings

See Figure A.9.

3.17
circulation of gases
heated air flow providing transfer of heat to, and moisture from, material in a dryer

NOTE The respective directions of air flow and material flow in a dryer are said to be

— parallel-flow if they progress in the same direction (see Figure A.11), and

— counter-flow if they progress in opposite directions (see Figure A.12).

3.18
drum dryer
equipment used to dry and heat aggregates

See Figure A.8.

3.19
RAP drum dryer
equipment used to dry and heat reclaimed asphalt pavements (RAP)

3.20
drum dryer-mixer
combination drum dryer and mixer used to dry and heat aggregates, possibly including additives and fillers, and subsequently mixing them with binder to produce asphalt mix

See Figures A.12 and A.13.

3.21
drum dryer-mixer with recycling capability
drum dryer-mixer having the ability to include RAP in the mixing process of asphalt mix production

3.22
mixer
pug mill
equipment used to homogenize and evenly coat constituent materials with additives or binder using a set of tools to agitate and displace the material bed

See Figures A.4 and A.10.

3.23
dry mixing time[1)]
duration from introduction of dry constituents until introduction of liquid constituents

3.24
wet mixing time
duration from introduction of liquid constituent until material begins to leave the mixing region

3.25
total mixing time[1)]
sum total of dry mixing time and wet mixing time

3.26
dwell time
duration material remains in a mixer

3.27
anti-segregation hopper
container receiving the material when there is a change of movement in the material in order to reduce the dynamic effect which might cause segregation

NOTE The hoppers are generally arranged at the output of the mixers, the dryer-mixer drums and the conveyors.

3.28
batching accuracy
relative deviation of the batched portion from the programmed value, expressed as a percent

NOTE Batching accuracy is expressed by the formula

$$\frac{m_a - m}{m} \times 100\ \%$$

where

m is the specified mass for batching;

m_a is the real value of a mass received in a batching process.

4 Descriptions of coating and/or mixing plants

4.1 Functions of the plant

The plant shall be capable of ensuring the following:

— storage and charging of aggregates;

— measuring out of aggregates;

— drying and heating of aggregates at a preset temperature;

— removal of dust from the gases emitted from the dryer;

— processing of gases from drying and heating so as to recover the fines, and secondly, limit the atmospheric pollution (see Figure A.14);

— re-introduction of reclaimed fines (if available);

1) Refers to asphalt mixing plants for batch production.

— storage and measuring out of hot binders;

— measuring out of hot aggregates;

— mixing of constituents to obtain a homogeneous and uniformly coated product;

— handling and storage of mixed materials (see Figure A.15);

— storage of fuels for heater used for heating the binder tanks and installations.

These functions may be ensured by plants operating continuously or using a batch system.

4.2 Components of asphalt mixing plants

Asphalt mixing plants may consist of the following components (see Figures A.1 to A.3):

— cold feed bins;

— dosing units for measuring out aggregates, situated underneath the bin outlets;

— conveyor for moving aggregates to a dryer;

— vibrating screen[2)];

— aggregate dosing unit[2)];

— dryer or dryer-mixer;

— dust collector;

— installation for re-introduction of reclaimed fines to the aggregates leaving dryer (if available);

— filler silo with feeder[2)] or dosing unit[2)];

— elevator for moving aggregates to a feed bin or vibrating screen[1)];

— binder tank;

— fuel (oil) tanks and installation for heating of binder tank and dryer's burner supply;

— vibrating screen;

— hot aggregate storage bins[1)];

— aggregate weighing unit[1)];

— binder weighing unit[1)];

— filler weighing unit[1)];

— batch mixer[1)];

— skip or drag slat conveyor for mixed material handling;

— mixed material holding or storage bin(s);

— feed bin[2)];

— binder dosing unit[2)];

— continuous mixer[2)];

— batcher;

— control station.

---

2) Refers to asphalt mixing plants for continuous production.

4.3 Additional equipment

The coating and/or mixing plants for materials treated with hot hydrocarbon binders may be completed by equipment to recycle reclaimed asphalt pavements (RAP) (see Figure A.12).

They shall ensure

— handling and batching of RAP, and

— drying and heating of these RAPs.

This equipment may be:

— installed near the coating plant; in this case, the dried and heated RAP are re-inserted at a specific point in the production cycle;

— installed as a complement to a coating plant in continuous production; in this case, the cold RAP proportioned by mass, shall be introduced in a specific zone of the rotary drum by means of a special device for charging recycled products (see Figure A.11); or

— an RAP drum with hot air circulation, installed near to an aggregate dryer drum.

The RAP and the new heated aggregates are put together on leaving their respective drums and processed in a continuous mixer. Each of the aggregates has previously been continuously fed either by volume or by mass.

4.4 Mastic asphalt production plants

These are of the same design as batch production plants, but they are particularly characterized by the fact that the materials are processed at higher temperatures (up to 250 °C).

4.5 Control of plant operation

4.5.1 Types of the control plant operational control

The following types of operation are possible:

— automatic;

— semi-automatic;

— manual.

4.5.2 Automatic operation

Automatic control shall ensure the following:

a) receiving the production program(s);

b) storing in the memory

   — the type and quantity of each of the constituent materials, and

   — the production volume required;

c) full control of the plant operation and product manufacture without operator intervention, except perhaps for emptying the mixer.

Production shall be monitored by the operator who has one or more screens available displaying, in particular

— the quantities of constituent materials proportioned,

— the system status (e.g. in the form of a flow diagram),

— the procedure for material preparation and mixing operations, and possibly

  — a printer to print out the different sections under automation, and

  — information such as the mass of storage containers or truck,

and any other information required to operate the plant.

4.5.3 Semi-automatic operation

The operator carries out

— display of composition,

— cycle start-up, and

— opening and closing of mixer.

The remaining operations are automated.

4.5.4 Manual operation

All basic operations are controlled by the operator. Manual control shall be capable of ensuring the operation of the facility in the event of a failure in the automatic system. It may also be used to adjust equipment settings.

4.6 Automatic function controls

This refers to devices providing the relationship between two or more operating parameters. The automatic controls cover the following:

— proportioning can only take place if the corresponding ingredient is present in the feed device of this proportioner;

— mixing can only be undertaken if all constituent materials have been proportioned and if each batched quantity corresponds to the quantity programmed, within the accuracy;

— transfer of materials from one machine to another can only be undertaken if the machine receiving it is in operation or ready to receive the materials.

These automatic controls have actions which take priority over orders coming from the plant automation system. Only the plant operator can, by voluntary action, override an automatic control instruction after this has been given.

4.7 Control station

A control station specifically contains the following:

— indicators of operational parameters;

— display screens;

— tools to interface with the automation;

— possibly a flow diagram;

— control units to switch to manual operation (safety);

— a means to monitor visually the asphalt mix loading into dump-haul truck.

5 Output of an asphalt mixing plant

Conventionally fixed parameters intended for calculating the output of an asphalt mixing plant are as follows.

a) Size of aggregate: 0 mm to 32 mm.

b) Granular class of aggregates to process in plants, comprising a maximum of

— reclaimed fines + imported filler 10 % of total mass of aggregates to process without binder(s),

— sands 0 mm to 2 mm 35 % of total mass of aggregates to process without binder(s),

— fines content of below 0,09 mm no more than 10 % of sand mass.

c) Apparent density of non-treated cold aggregates (except 90 µm powders) up to 1 600 kg/m^3.

d) Apparent density of materials treated with hydrocarbon binders up to 1 800 kg/m^3.

NOTE The apparent density of materials treated with hydrocarbon binders decreases because of their swell on output from mixers and coaters.

e) Temperature to treat aggregates 10 °C to 20 °C.

f) Rise in temperature of aggregates treated in the plant 140 °C to 180 °C.

g) Residual water content of aggregates hot mixed in the plant up to 0,5 %.

h) Temperature of binder (bitumen 60/70) used in the plant 160 °C to 180 °C.

i) Hot binder content no more than 7,5 % of total mass of aggregates.

j) Calorific value of fuel typically 42,7 MJ/kg (for gas oil).

k) Air humidity up to 90 %.

l) Ambient temperature 15 °C to 25 °C.

m) Altitude less than 400 m.

n) Throughput of screens

— passing fractions at 2 mm mesh 30 % to 50 %,

— outsized particles 10 %.

6 Commercial specifications

6.1 Technical characteristics of the components of asphalt mixing plant

6.1.1 Cold feed bins

Specify the following:

a) number of hoppers and/or bins

b) maximum volume (heaped material) of each hopper and/or bin m^3

c) output of each weigh-belt:

- minimum t/h
- maximum t/h

d) mass kg.

6.1.2 Drum dryers, drum dryer-mixers, RAP drum dryers, and drum dryer-mixers with recycling capability

Specify the following:

a) type of aggregate dryer:

- drum dryer with counterflow circulation,
- drum dryer-mixer with counterflow or parallel flow circulation of gases,
- RAP drum dryer with parallel flow circulation of gases,
- RAP drum dryer with counterflow circulation of gases, or
- drum dryer-mixer with recycling capability and with twin drum and counterflow circulation of gases;

b) maximum output of aggregates t/h

c) minimum output of aggregates t/h

d) horizontal tilt of drum degrees

e) maximum flow of gases through drum Nm^3/h[3)]

f) minimum flow of aggregates[4)] to process for

- a water content of 3 % t/h
- a water content of 5 % t/h

g) mass kg

h) drum overall diameter m

i) drum overall length m

---

3) $N{\cdot}m^3$ or standard cubic metre: volume of gas in relation to normal conditions of 0 °C and $1{,}013 \times 10^5$ Pa.

4) Including reclaimed fillers recovered by the dust collector.

j) burner

- type of fuel(s)
- lower calorific value — MJ/kg
- capacity — MW

6.1.3 Dust collectors

Specify the following:

- maximum acceptable temperature of gases to process — °C

6.1.3.1 Hydraulic collectors

Specify the following:

- capacity of settling tank — m^3
- maximum concentration of sludge in wash water leaving the settling tank — g/dm^3
- mass — kg

6.1.3.2 Textile collectors

Specify the following:

- capacity at gas temperature of 125 °C — m^3/h
- total filtering area — m^2
- active filtering area after deduction of cleaning area — m^2
- maximum speed through textile — m/min
- maximum acceptable load loss — kg
- textile cleaning system
- mass — kg

6.1.3.3 Cyclone collectors

Specify the following:

- type of cyclone collector
  - one-stage dust collectors composed of batteries,
  - two-stage dust collector composed of cyclone batteries and multicyclone batteries
- first stage efficiency — %
- second stage efficiency — %
- mass — kg

6.1.3.4 Stack

Specify the following:

— height m

— diameter m

6.1.4 Mixture preparation and mixing units

6.1.4.1 Hot elevator

Specify the following:

— maximum capacity of aggregates t/h

— mass kg

6.1.4.2 Hot screening units

Specify the following:

— number of screens

— number of levels per screen

— size of mesh on each level mm

— screening area of each level m^2

— maximum capacity[5)] at sand level t/h

— maximum capacity[5)] of all levels t/h

— mass kg

6.1.4.3 Hot aggregate storage silo

Specify the following:

— number of compartments

— maximum load of each compartment t

— insulation of hot aggregate storage

— mass kg

The available capacity of each compartment shall take into account the position of overflow openings and the angle of natural repose of aggregates as they arrive in the silo.

6.1.4.4 Filler silos

Specify the following:

— number of silos

— maximum capacity of each silo t

5) For predetermined mixtures.

— output from each feeder at each bin base:
  — minimum t/h or m^3/h
  — maximum t/h or m^3/h
— mass kg

6.1.4.5 Filler elevator

Specify the following:

— capacity t/h

6.1.4.6 Liquid binder storage tanks

Specify the following:

— number of tanks
— working volume of each tank m^3
— maximum internal operating pressure MPa
— output from each distributor of each tank:
  — minimum t/h or m^3/h
  — maximum t/h or m^3/h
— insulation of hot binder storage tanks and transfer equipment
— mass kg

6.1.4.7 Constituent material proportioners

Specify the following for each constituent material (aggregates, powders, binder and additives).

a) Batch system:
  — number and destination of containers
  — maximum load of each container kg
  — maximum range of each weighing instrument kg
  — batching accuracy:
    — aggregates %
    — filler %
    — binder %
    — additives %
    — mass kg

b) Continuous system (by volume or mass)
  — output of dosing units t/h if by mass, or m^3/h by volume
  — mass kg

6.1.4.8 Mixers

Specify the following:

— working capacity of mixer[6)]	dm^3 or kg
— hourly output in batch system (discontinuous production)	t/h
— hourly output in continuous production	t/h
— mass	kg

6.1.4.9 Handling and storage of mixed materials

Specify the following.

a) Handling equipment:

— capacity of skip	m^3 and t
— capacity of batcher	m^3 and t
— output of drag slat conveyor	t/h
— capacity of direct unloading hopper	m^3 and t
— mass	kg

b) Storage of mixed materials:

— numbers of storage bins	
— net tonnage capacity of each bin	t
— clearance height under bins	m
— insulation of bins	
— mass	kg

NOTE Tonnages valid for an angle of repose equal to 27° and an apparent density of material equal to 1,8 t/m^3.

6.1.4.10 Heating system

Specify whether oil or electric heating system, and the following:

— fuel type	
— maximum capacity	kW
— volume of fuel storage tank	m^3
— mass	kg

6) Defined as a volume or mass of constituting materials for one batch.

6.1.4.11 Control station

Specify the following overall dimensions:

— length mm

— width mm

— height mm

— mass kg

6.1.4.12 Electric heated binder tanks

Specify the following:

— heating capacity per tank kW

— heating capacity for pipes kW/m

6.1.4.13 Cold RAP system

Specify the following:

a) cold feed bins:
   — number
   — capacity m^3

b) weighing system:
   — weigh-belt
   — weighing hopper

c) conveying system capacity t/h

d) batch scale t

e) maximum allowable moisture content %

f) water vapour extraction:
   — diameter mm
   — insulation (material, thickness)

6.1.4.14 Hot RAP system

Specify the following:

a) cold feed bins:
   — number
   — capacity m^3

b) weighing system:
   — weighing hopper
   — differential weighing

c) RAP drum:

- type
- diameter — m
- length — m
- maximum allowable RAP temperature — °C

d) hot RAP storage silo(s):

- capacity — m^3
- heating
- insulation (material, thickness)

6.1.5 Belt conveyors

Specify the following:

- number of belt conveyors
- length — m
- width — m
- speed — m/s
- capacity — t/h

6.2 Global characteristics for plants to be specified by the manufacturer

Specify the following:

a) operating mode of a plant

- continuous production
- batch production

b) maximum grading of aggregates to be processed — mm

c) plant output at aggregate humidity of 5 % and mixed material temperature of 180 °C — t/h

d) power

- power installed — kW
- simultaneous power use — %
- control system:
  - hardware
  - software
  - data transfer

e) fuel consumption per ton of product — l

f) control system
   - automatic
   - manual

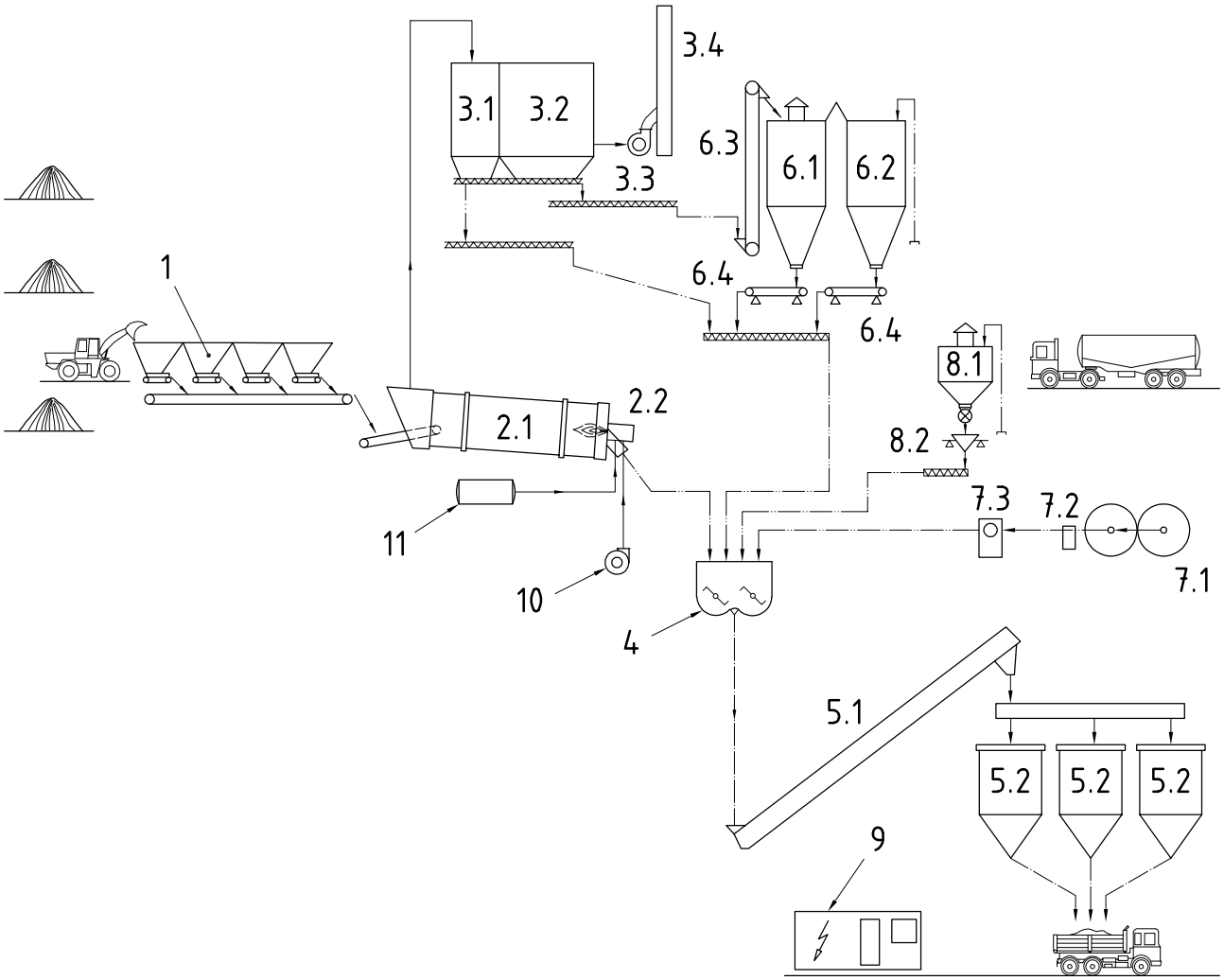
g) fitting with control station

h) overall dimensions
   - length m
   - width m
   - height m

i) total mass kg

Annex A
(informative)

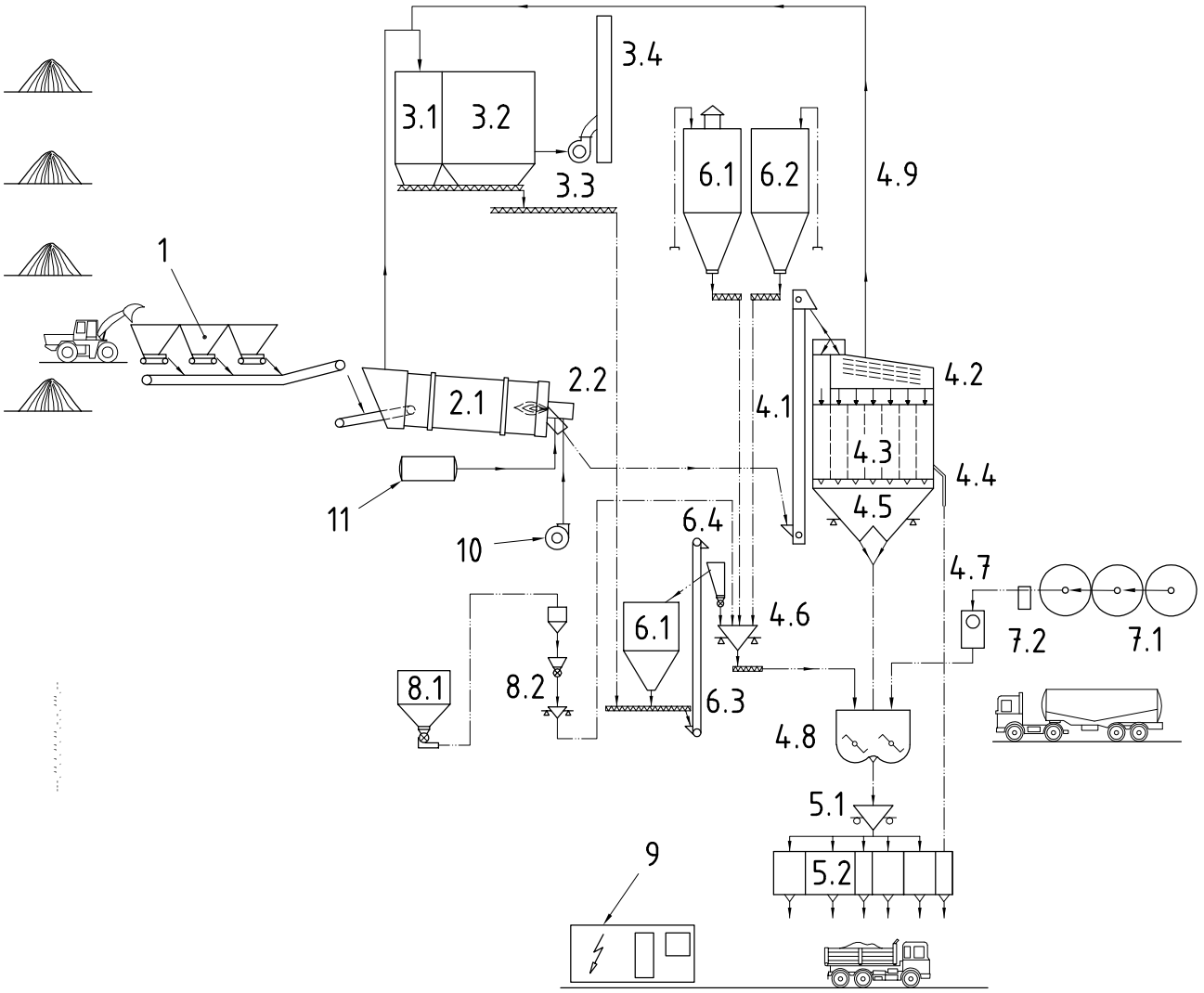
Examples of plants and sub-assemblies



Key

1	cold feed bins, pre-batching and collecting belts	
2.1	drum dryer with charging conveyor	drying and heating system
2.2	burners for generation of hot gases	
3.1	primary dust collector	dust removal system
3.2	dust filtering	
3.3	exhaust fan	
3.4	stack	
4	continuous mixer	
5.1	charging conveyor	mixed material storage assembly
5.2	mixed material storage bins	
6.1	own filler silo	filler distribution assembly
6.2	imported filler silo	
6.3	filler elevator	
6.4	belt-weighing unit	
7.1	heated binder tank	binder storage assembly
7.2	binder pump	
7.3	fluid meter	
8.1	special components silo	system for adding of special components
8.2	special components weighing unit	
9	operation centre, electrical equipment and control	
10	air blower	
11	fuel tank	

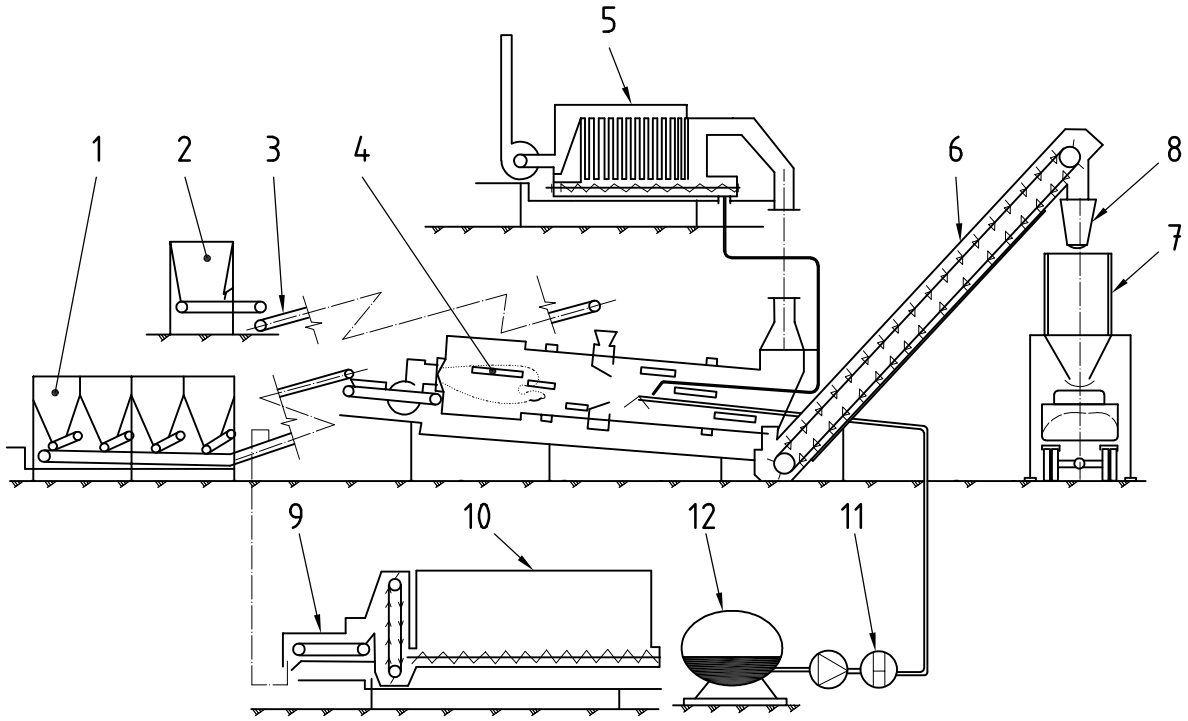
Figure A.1 — Asphalt mixing plant for continuous production



Key

1	cold feed bins, pre-batching and collecting belts	
2.1	drum dryer with charging conveyor	drying and heating system
2.2	burners for generation of hot gases	
3.1	primary dust collector	dust removal system
3.2	dust filtering	
3.3	exhaust fan	
3.4	stack	
4.1	hot aggregate elevator	mixing tower
4.2	screen	
4.3	hot aggregate silo/bin	
4.4	oversize rejects	
4.5	aggregate-weighing unit	
4.6	filler-weighing unit	
4.7	binder-weighing unit	
4.8	batch mixer	
4.9	mixing tower dust extraction system	
5.1	charging conveyor	mixed material storage assembly
5.2	mixed material storage bins	
6.1	own filler silo	filler distribution assembly
6.2	imported filler silo	
6.3	filler elevator	
6.4	belt-weighing unit	
7.1	heated binder tank	binder storage assembly
7.2	binder pump	
8.1	special components silo	system for adding special components
8.2	special components weighing unit	
9	operation centre, electrical equipment and control	
10	air blower	
11	fuel tank	

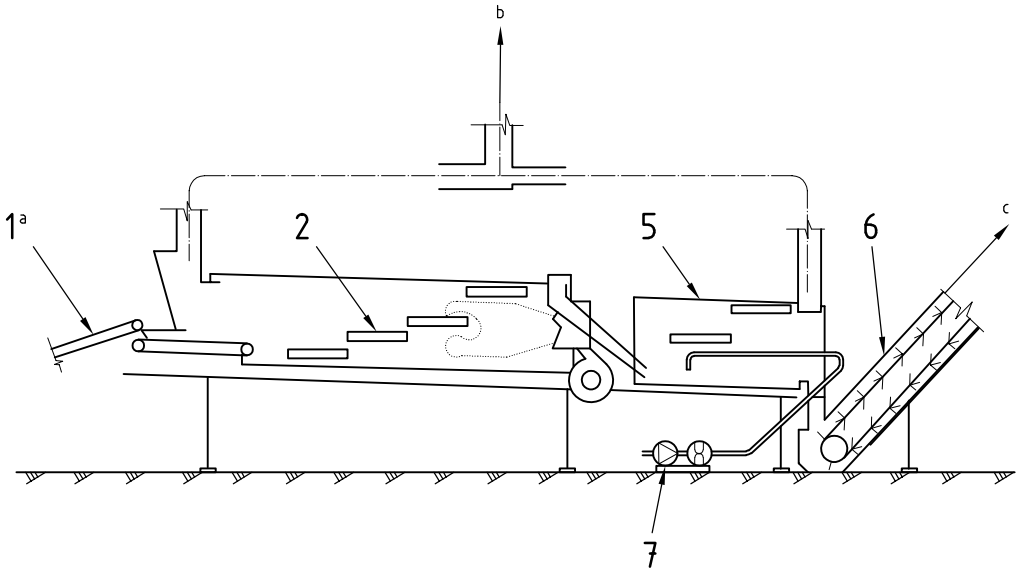
Figure A.2 — Asphalt mixing plant for batch production



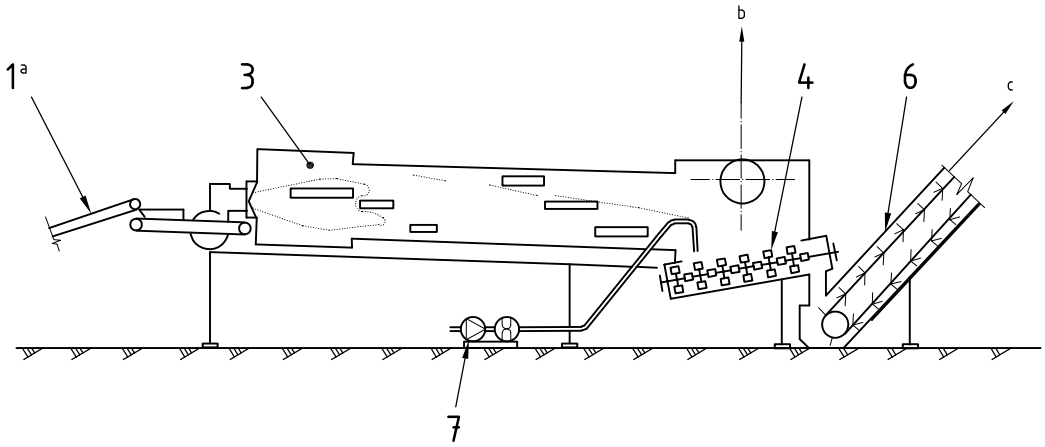
Key

1 cold feed bins, pre-batching and collecting belts
2 recycling bin
3 belt conveyor
4 drum dryer-mixer (parallel flow)
5 dust collector
6 drag slat conveyer
7 mixed material storage bin
8 receiving hopper
9 imported filler dosing unit
10 imported filler silo
11 binder dosing unit
12 binder tank

Figure A.3 — Asphalt mixing plant for continuous production with drum dryer-mixer



a) Drum dryer with separate drum-mixer



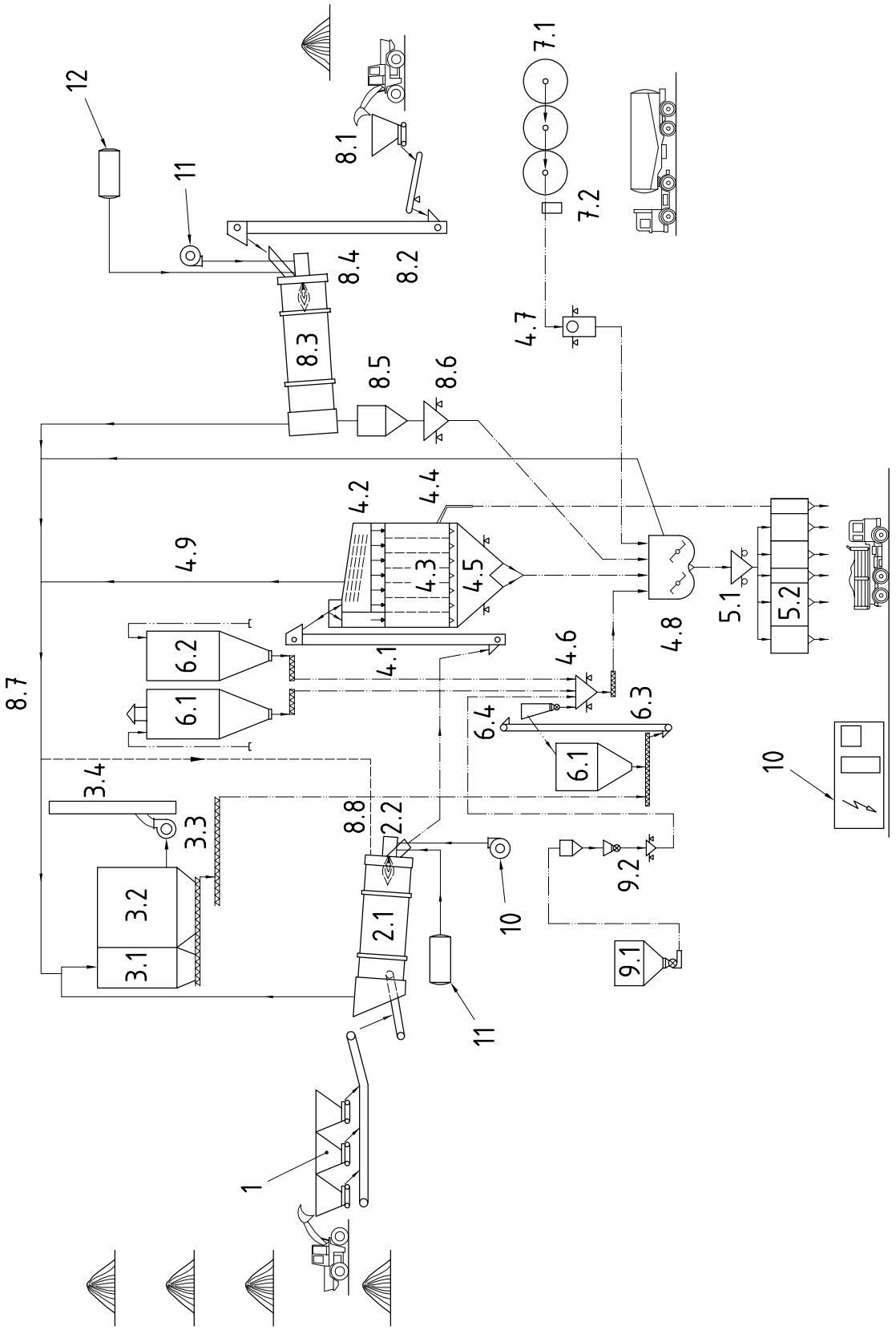
b) Drum dryer in one housing with trough mixer

Key

1 belt conveyors
2 dryer counterflow
3 dryer parallel flow
4 trough mixer
5 coating drum mixer or could be replaced by a dryer and a twin shaft mixer
6 drag slat conveyor
7 binder dosing unit

a Aggregates from the cold-feed bins.
b Dust to the collector.
c Mixed materials to the storage bins.

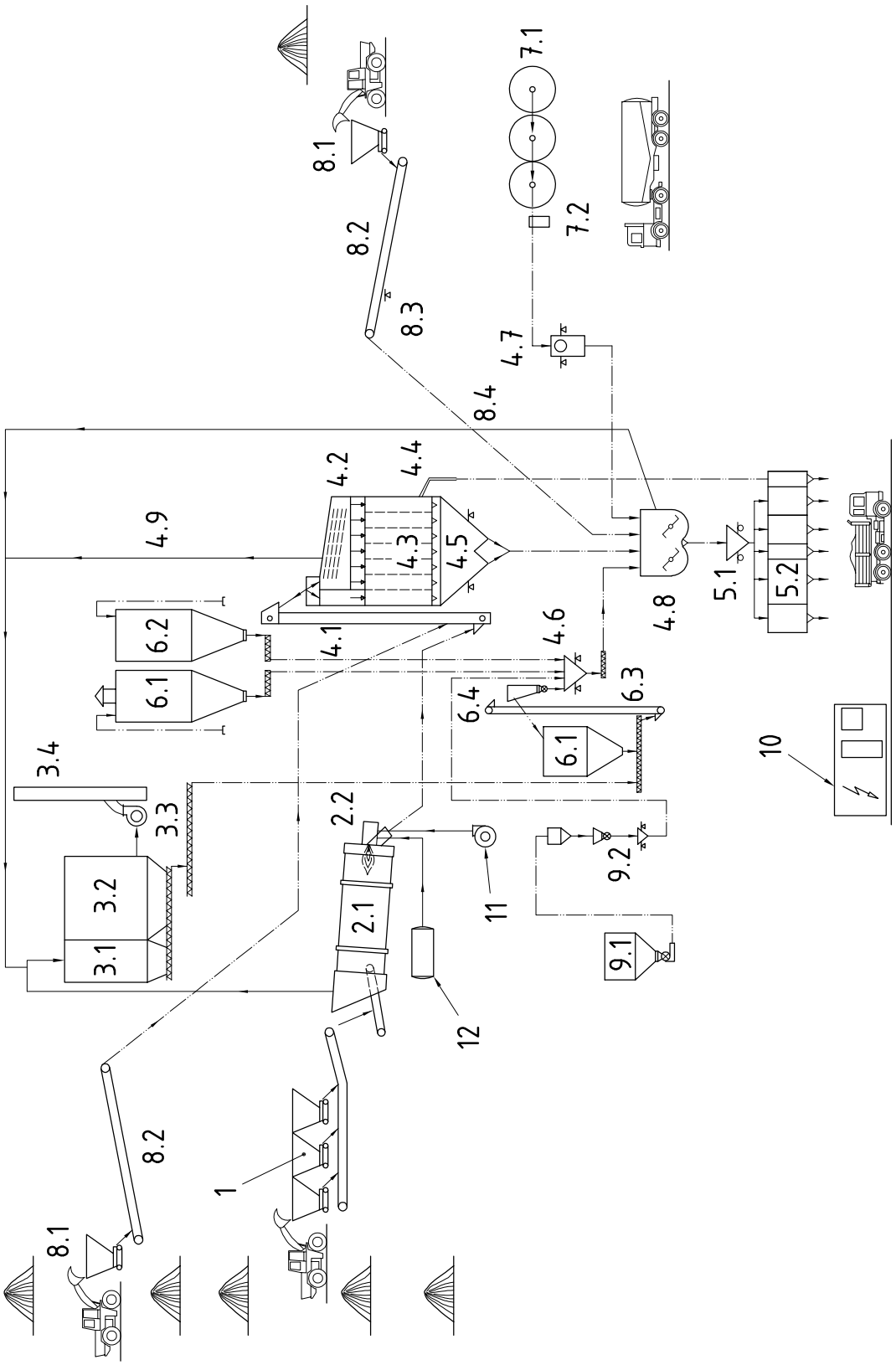
Figure A.4 — Different design of asphalt mixing plants for continuous production



Key

1	cold feed bins, pre-batching and collecting belts	
2.1	drum dryer with charging conveyor	drying and heating system
2.2	burners for generation of hot gases	
3.1	primary dust collector	dust removal system
3.2	dust filtering	
3.3	exhaust fan	
3.4	stack	
4.1	hot aggregate elevator	mixing tower
4.2	screen	
4.3	hot aggregate silo/bin	
4.4	oversize rejects	
4.5	aggregate-weighing unit	
4.6	filler-weighing unit	
4.7	binder-weighing unit	
4.8	batch mixer	
4.9	mixing tower dust extraction system	
5.1	charging weighing unit	mixed material storage assembly
5.2	mixed material storage bins	
6.1	own filler silo	filler distribution assembly
6.2	imported filler silo	
6.3	filler elevator	
6.4	filler receiver	
7.1	heated binder tank	binder storage assembly
7.2	binder pump	
8.1	granulated asphalt dosing unit	system for adding hot granulated asphalt
8.2	granulated asphalt elevator	
8.3	drum with charging chute	
8.4	burners for generation of hot gases	
8.5	intermediate receiver	
8.6	granulated asphalt weighing unit	
8.7	off-take of exhaust gases directly to dust-removing system	
8.8	off-take of exhaust gases	
9.1	special components silo	system for adding special components
9.2	special components weighing unit	
10	operation centre, electrical equipment and control	
11	air blower	
12	fuel tank	

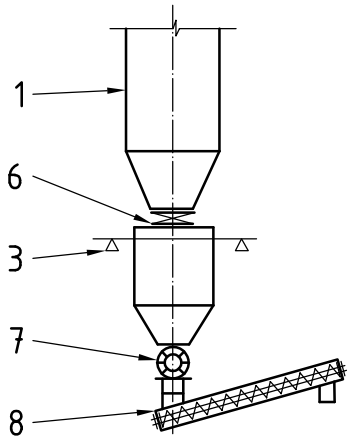
Figure A.5 — Asphalt mixing plant for batch production with use of hot granulated asphalt

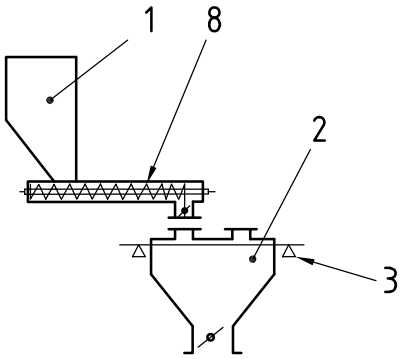


Key

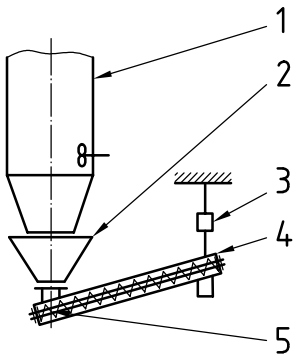
1	cold feed bins, pre-batching and collecting belts	
2.1	drum dryer with feed conveyor	drying and heating system
2.2	burners for generation of hot gases	
3.1	primary dust collector	dust-removal system
3.2	dust filtering	
3.3	exhaust fan	
3.4	stack	
4.1	hot aggregate elevator	mixing tower
4.2	screen	
4.3	hot aggregate silo/bin	
4.4	oversize rejects	
4.5	aggregate-weighing unit	
4.6	filler-weighing unit	
4.7	binder-weighing unit	
4.8	batch mixer	
4.9	mixing tower dust extraction system	
5.1	charging weighing unit	mixed material storage assembly
5.2	mixed material storage bins	
6.1	own filler silo	filler distribution assembly
6.2	imported filler silo	
6.3	filler elevator	
6.4	filler receiver	
7.1	heated binder tank	binder storage assembly
7.2	binder pump	
8.1	granulated asphalt dosing unit	system for adding hot granulated asphalt
8.2	granulated asphalt belt conveyor	
8.3	weighing of granulated asphalt	
8.4	steam supply conduit	
9.1	special component silo	system for adding special components
9.2	special component weighing unit	
10	operation centre, electrical equipment and control	
11	air blower	
12	fuel tank	

Figure A.6 — Asphalt mixing plant for batch production with use of a cold granulated asphalt

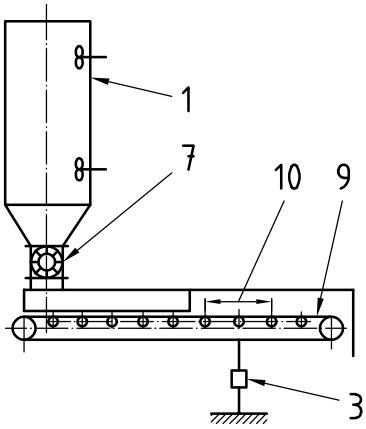




a) For batch production



b) For continuous production with screw feeder

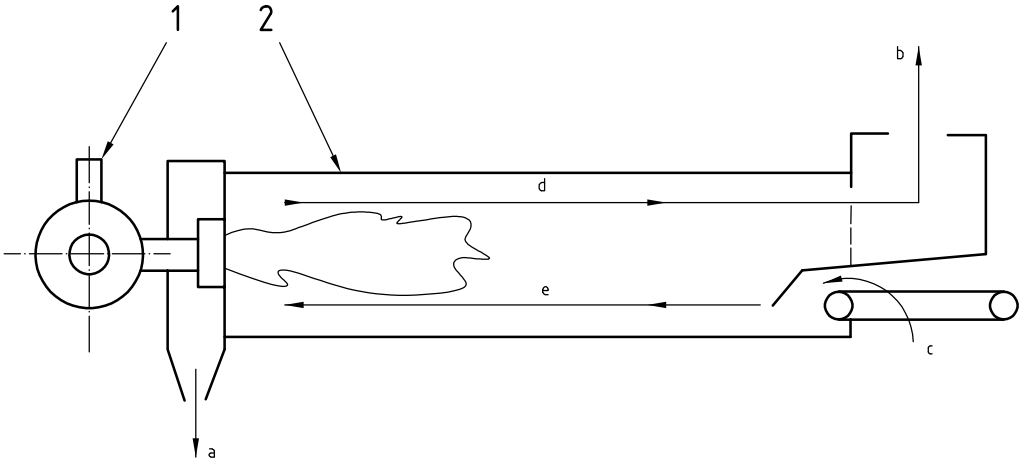


c) For continuous production with weighing belt

Key

1 vertical silo
2 filler weighing unit
3 load sensor
4 screw weighing feeder
5 screw feeder hinge
6 fast closing valve
7 rotary vane feeder
8 screw feeder
9 belt-weighing unit
10 weighing zone

Figure A.7 — Different types of filler dosing units



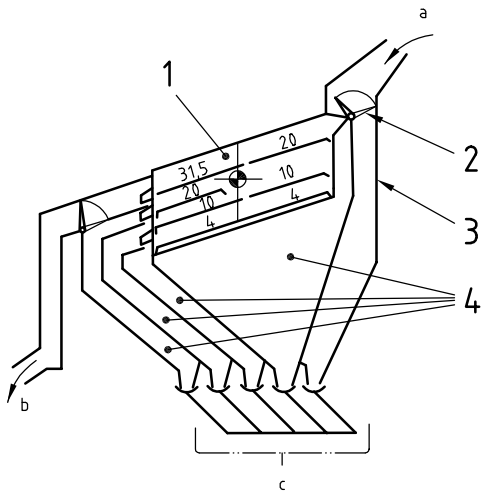
Key

1 burner
2 drum dryer

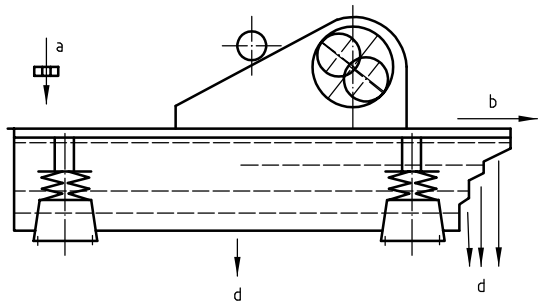
a Output of hot aggregates.
b Output of gases to dust collector.
c Direction of cold flow.
d Direction of hot gas flow.
e Direction of movement of aggregates.

Figure A.8 — Drum dryer with counterflow circulation

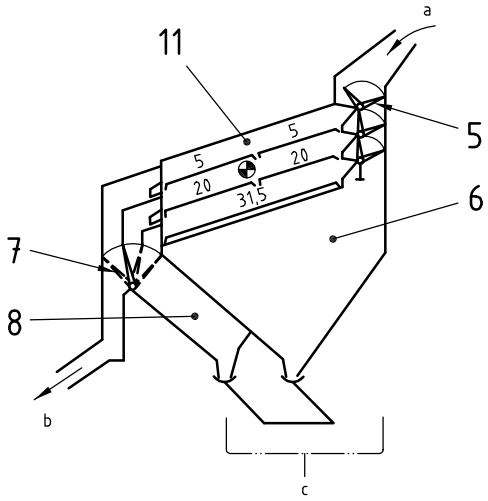
Values in micrometres



a) Typical sizing grader with three screening surfaces



b) Vibrating screen with horizontal screening surfaces



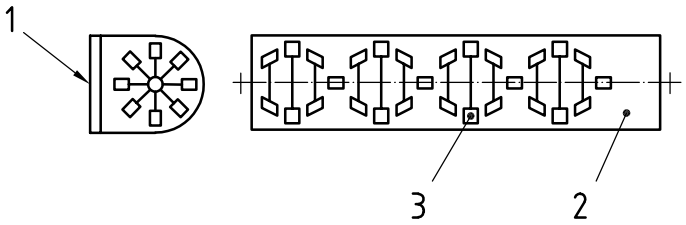
c) Levelling sizing grader with optional working screening surfaces

Key

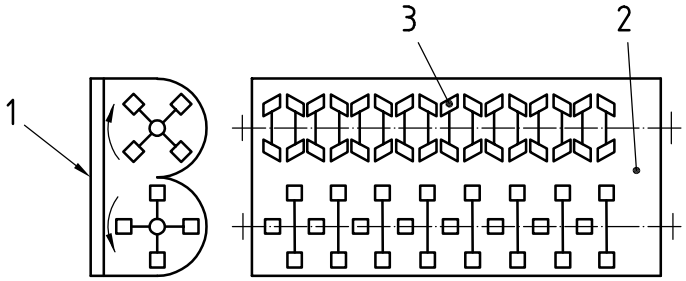
1 three-level screen
2 screen bypass
3 aggregate feed compartment
4 hot aggregate storage hoppers
5 selection flaps for grading levels
6 aggregate feed
7 feeder flap for levelled aggregates
8 levelled aggregate storage hoppers (except sand)

a Hot aggregates.
b Over-sized rejects.
c To aggregate weighing unit.
d To hot aggregate storage hoppers.

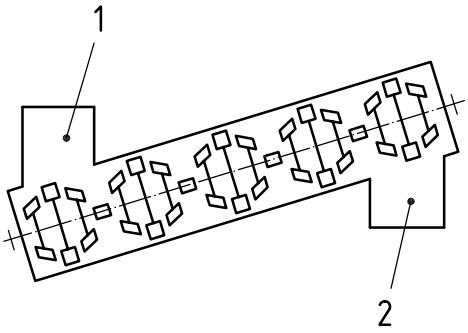
Figure A.9 — Vibrating screen with bin



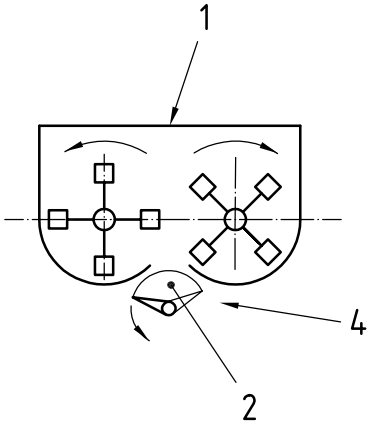
a) Single-shaft trough mixer for continuous production



b) Twin-shaft trough mixer for continuous production



c) Single-shaft inclined axis mixer for continuous production

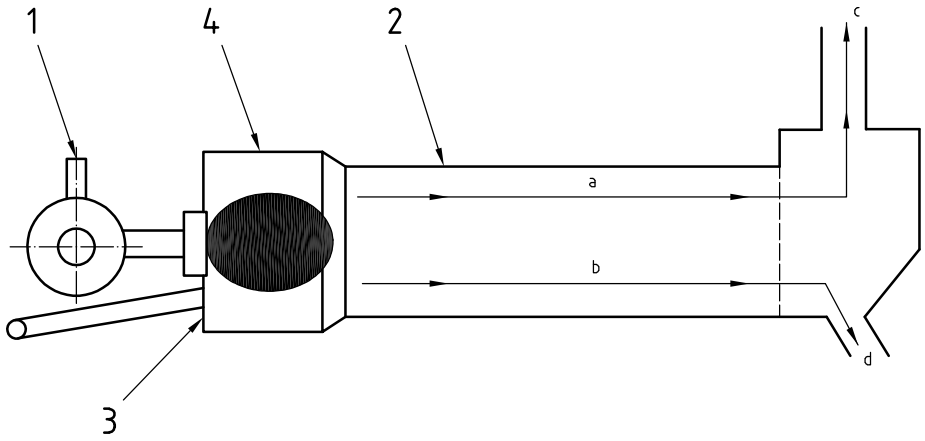


d) Twin-shaft pug mill for batch production

Key

1 materials supply
2 materials discharge
3 paddles with adjustable angular position
4 discharging plug

Figure A.10 — Different type of mixers

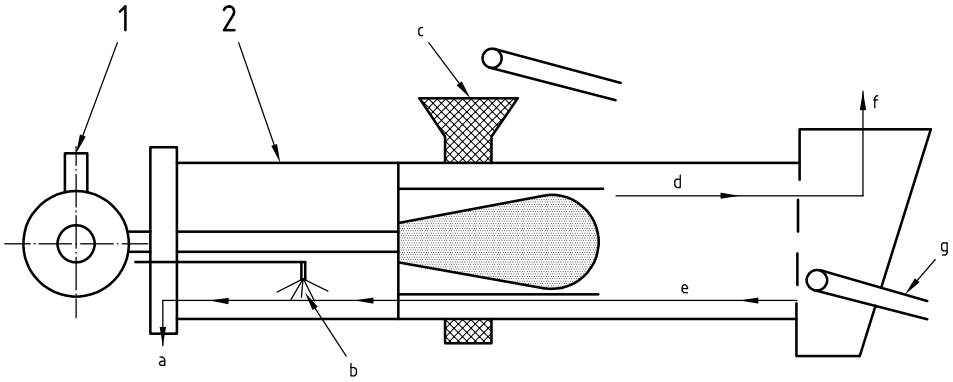


Key

1 burner
2 recycling dryer
3 RAP material feed
4 combustion zone

a Gas flow direction.
b RAP movement direction.
c Output of gases to dust collector or dryer.
d Output of heated RAP.

Figure A.11 — Recycling dryer with parallel flow circulation of gases

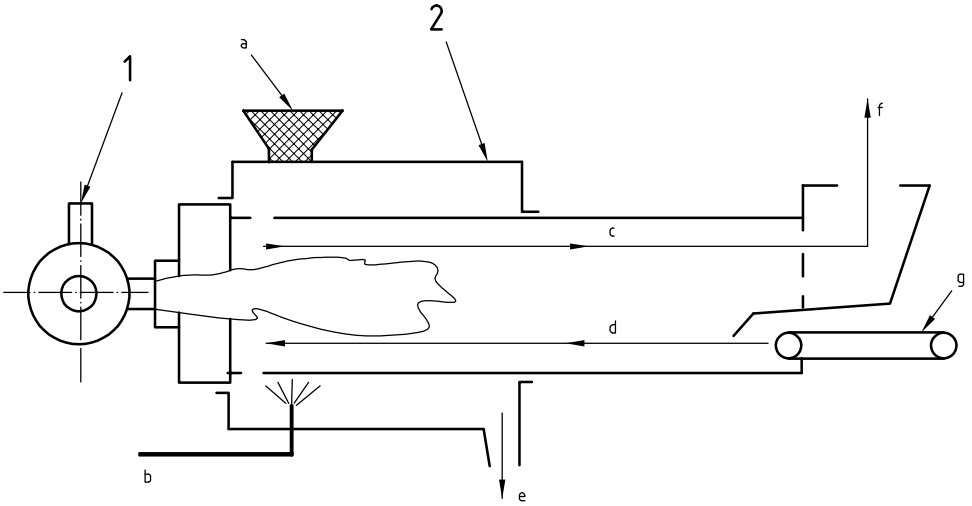


Key

1 burner
2 recycling drum dryer-mixer

a Output of coated materials.
b Injection of binder.
c Recycled aggregates.
d Direction of flow of gases.
e Direction of movement of aggregates.
f Output of gases to dust collector.
g Natural aggregates.

Figure A.12 — Recycling drum dryer-mixer with counterflow circulation of gases

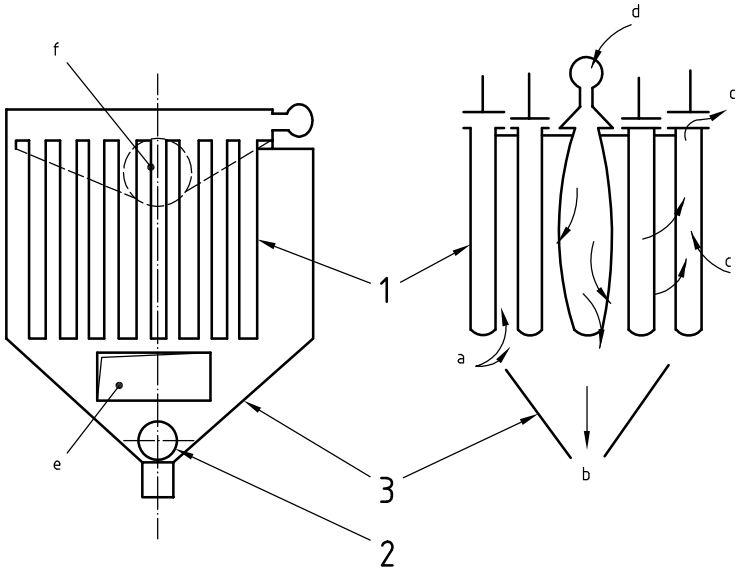


Key

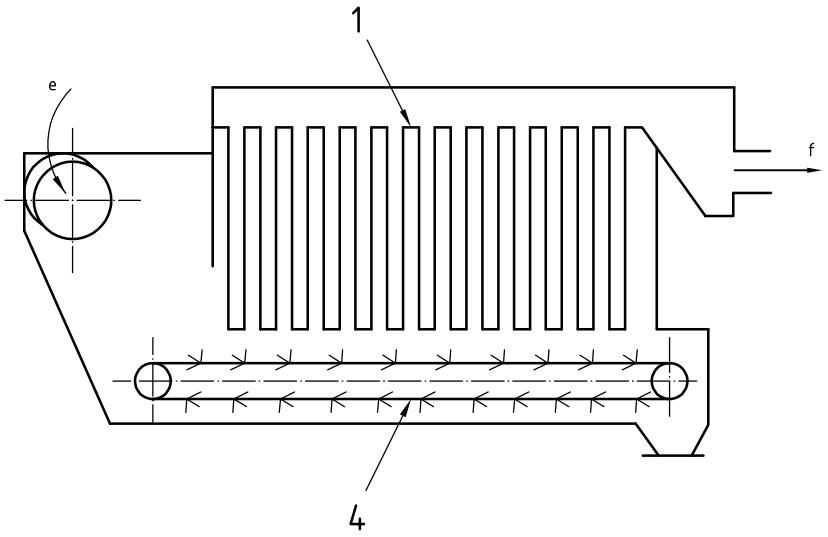
1 burner
2 recycling drum dryer-mixer

a Recycled aggregates.
b Injection of binder.
c Direction of flow of gases.
d Direction of movement of aggregates.
e Output of coated materials.
f Output of aggregates to dust collector.
g Cold natural aggregates.

Figure A.13 — Recycling drum dryer-mixer with twin drum and counterflow circulation of gases



a) With screw conveyor



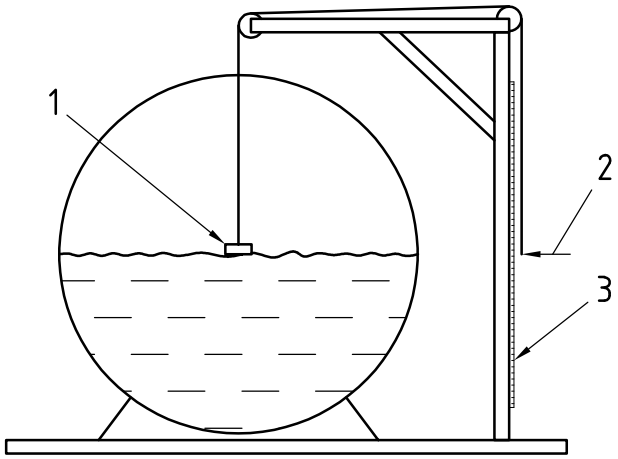
b) With drag conveyor

Key

1 filtering bags
2 screw conveyor
3 dust-receiving hoppers
4 drag conveyor

a Raw gas.
b Dust.
c Clean gases.
d Clean air.
e Input of raw gas.
f Output of clean gases.

Figure A.14 — Different types of dust collectors with textile filtering

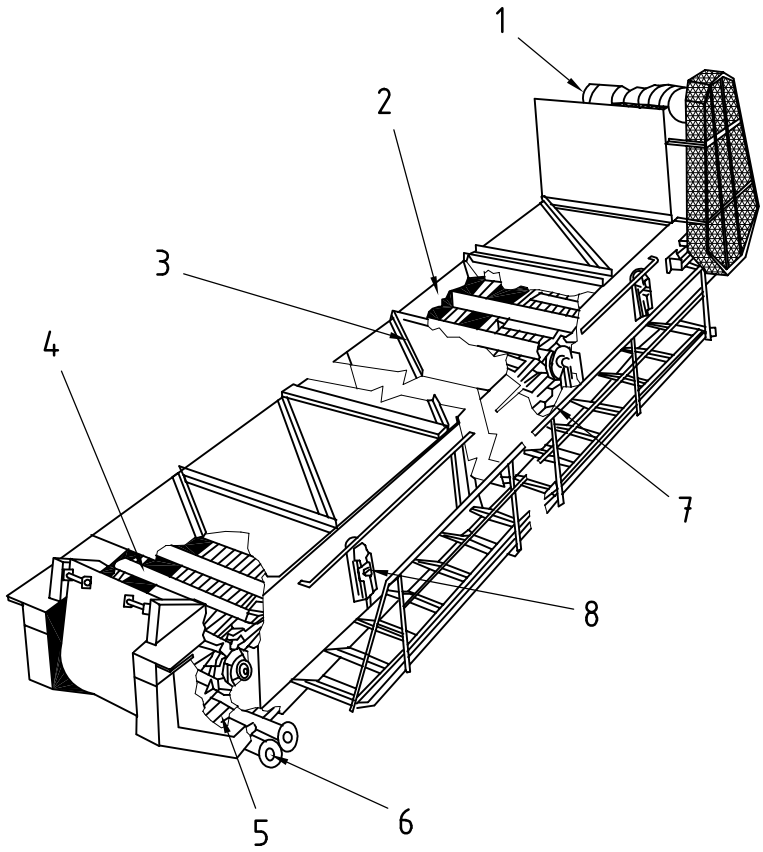


Key

1 float
2 indicator
3 graduated marker

NOTE Binder tanks have the ability to plug if they run low on binder. An effective remedy is to fit a level indicator as shown in the example above. Other methods may be used.

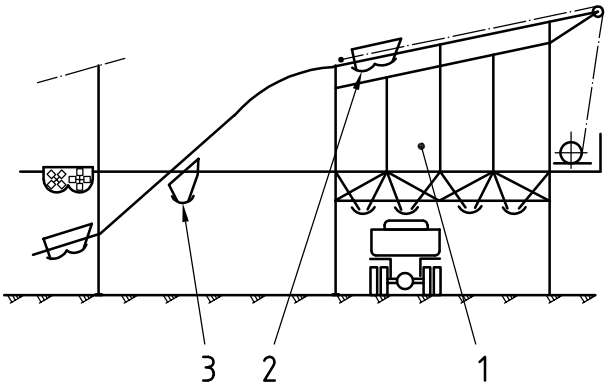
Figure A.15 — Level indicator in the binder tank



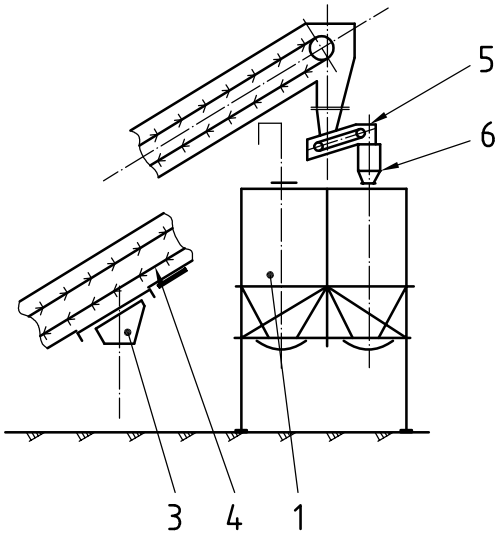
Key

1 reduction gear
2 slat
3 covers
4 sliding bearings
5 tensioning element
6 oil heater
7 chains
8 friction bearing

Figure A.16 — Drag slat conveyor



a) With automatic skip



b) With drag slat conveyor

Key

1 mixed material storage bins
2 automatic skip
3 direct unloading hopper
4 drag slat conveyor
5 swivel drag slat conveyor
6 receiving hopper

Figure A.17 — Handling and storage of mixed materials

ICS 01.040.93; 93.080.10; 93.080.20

Price based on 36 pages